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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 09/755,572 | 01/08/2001 | Ting Cheong Ang | CS99-224 | 3795 |
| 28112 | 7590 | 12/16/2003 | EXAMINER | |
| GEORGE O. SAILE & ASSOCIATES 28 DAVIS AVENUE POUGHKEEPSIE, NY 12603 | | | LEE, HSIEN MING | |
| | | | ART UNIT | PAPER NUMBER |

2823

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/755,572

Applicant(s)

ANG ET AL.

Examiner

Hsien-Ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 8-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Remarks

1. Applicants' RCE filling is acknowledged.
2. Claims 1-5 and 8-11 are pending in the application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Babcock et al. (US 2002/0047155) in view of Jun et al. (US 6,406,948).

In re claims 1, 3, 8 and 9, Babcock et al., in Figs. 2B, 4B, 6B and related text, teach the claimed method of forming a silicon-on-insulator device the fabrication of integrated circuits, comprising:

- providing a silicon layer 265 overlying an oxide layer 280 on a silicon semiconductor substrate 290;
- etching first trench 275 into said silicon layer 265 wherein said first trench 275 extends partially through said silicon layer 265 and does not extend to underlying said oxide layer 280 and wherein no implant is made underlying said first trench 275;
- filling said first trench 275 with insulating layer such as oxide (paragraph [0022]);
- etching second trenches 270 into said silicon layer 265 wherein said second trenches 270 extend fully through said silicon layer 265 to underlying said oxide layer 280 and

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wherein said second trenches 270 separate active areas 220, 250, 260 of said semiconductor substrate and wherein one said first trenches 275 lies within each of said second said active areas 210;

- filling said second trenches 270 with an insulating layer (paragraph [0022]);
- thereafter forming gate electrodes 200 or 520 and associated drain regions 210/220 or 490/500 and on said silicon layer 265 between said second trenches 270; and
- depositing a dielectric layer 530 overlying said gate electrodes 230 and 240 (Fig.6B).

Babcock et al., do not teach depositing an interlevel dielectric layer overlying said gate electrodes; opening first contacts through said interlevel dielectric layer to underlying said source and drain regions and opening a second contact opening through said interlevel dielectric layer each of said active regions wherein said second contact opening contacts both said first trench and one of said second trenches; filling first and second contact openings with conducting layer to complete formation silicon-on-insulator device in said fabrication integrated circuits.

Jun et al., in an analogous art, teach depositing an interlevel dielectric layer 36 overlying said gate electrodes 30 (Fig.6); opening first contacts through said interlevel dielectric layer 36 to underlying said source and drain regions 32 (Fig.6) and opening a second contact opening through said interlevel dielectric layer 36 (Fig.8), wherein said second contact opening contacts both said first trench (i.e. the deep trench on the left, Fig.8) and one of said second trenches (i.e. the deep trench on the right, Fig.8); and filling first and second contact openings with conducting layer 44 (Fig.9).

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Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made, to integrate the method of Babcock et al. with the method of Jun et al., since by this manner it would form an integrated circuit for the application of electrostatic discharge device.

In re claim 2, the selection of the trench depth is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious). In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. See M.P.E.P. 2144.05,

III

In re claims 4 and 10, Babcock et al. in view of Jun et al. teach that the interlevel dielectric layer comprises BPSG having a thickness of about from 6,000 to 20,000 Angstroms (col. 3, lines 23-26, Jun et al.).

In re claims 5 and 11, Babcock et al. in view of Jun et al. teach that the conductive layer comprises tungsten or aluminum/copper (col. 3, lines 43-44, Jun et al.).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is 703-305-7341. The examiner can normally be reached on M-F (9:00 ~ 5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hsien-Ming Lee
Examiner
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A handwritten signature in black ink, appearing to read 'Lee', with a long horizontal flourish extending to the right.

Dec. 11, 2003